

	Type	L #	Hits	Search Text	DBs
1	BRS	L1	11545	microfluid\$6	US- PGPUB; USPAT
2	BRS	L2	1120	1 and (channel or microchannel) with network	US- PGPUB; USPAT
3	BRS	L3	286	2 and manifold	US- PGPUB; USPAT
4	BRS	L5	48	1 and (mate or mated or mating or integrate or integrated or integrating) same substrate same manifold	US- PGPUB; USPAT
5	BRS	L4	19	2 and (mate or mated or mating or integrate or integrated or integrating) same substrate same manifold	US- PGPUB; USPAT
6	BRS	L7	83	1 and (mate or mated or mating or integrate or integrated or integrating) same (substrate or body or base or layer) same manifold	US- PGPUB; USPAT
7	BRS	L6	23	2 and (mate or mated or mating or integrate or integrated or integrating) same (substrate or body or base or layer) same manifold	US- PGPUB; USPAT
8	BRS	L8	2340	(mate or mated or mating or integrate or integrated or integrating) same (substrate or body or base or layer) same manifold	US- PGPUB; USPAT
9	BRS	L9	712	8 and (polymer\$6 or glass or ceramic) same (substrate or body or base)	US- PGPUB; USPAT
10	BRS	L10	517	8 and (polymer\$6 or glass or ceramic) with (substrate or body or base)	US- PGPUB; USPAT

	Type	L #	Hits	Search Text	DBs
11	BRS	L11	603	8 and (electrokinetic or electroosmotic or electrophoretic or dielectrophoretic or modulator or gravity or magnetic or wicking)	US-PGPUB; USPAT
12	BRS	L12	206	10 and (electrokinetic or electroosmotic or electrophoretic or dielectrophoretic or modulator or gravity or magnetic or wicking)	US-PGPUB; USPAT

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thesaurus added in PCTFULL  
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second quarter; strategies may be affected  
NEWS 16 MAY 10 CA/CAPLUS enhanced with 1900-1906 U.S. patent records  
NEWS 17 MAY 11 KOREAPAT updates resume  
NEWS 18 MAY 19 Derwent World Patents Index to be reloaded and enhanced  
  
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=> s microfluid?  
L1 16103 MICROFLUID?

=> s l1 and ?channel (8w) network  
L2 217 L1 AND ?CHANNEL (8W) NETWORK

=> s l2 and manifold  
L3 0 L2 AND MANIFOLD

=> s l1 and manifold  
L4 125 L1 AND MANIFOLD

=> s l1 and manifold (p) (substrate or body or base or layer) (p) (channel or microchannel) (s) network  
PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH  
FIELD CODE - 'AND' OPERATOR ASSUMED 'MANIFOLD (P) '  
PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH  
FIELD CODE - 'AND' OPERATOR ASSUMED 'LAYER) (P) '  
PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH  
FIELD CODE - 'AND' OPERATOR ASSUMED 'MANIFOLD (P) '  
PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH  
FIELD CODE - 'AND' OPERATOR ASSUMED 'LAYER) (P) '  
L5 0 L1 AND MANIFOLD (P) (SUBSTRATE OR BODY OR BASE OR LAYER) (P)  
(CHANNEL OR MICROCHANNEL) (S) NETWORK

=> s l1 and (integrat? or mat? or connect? or bond?) (s) manifold  
2 FILES SEARCHED...

L6 59 L1 AND (INTEGRAT? OR MAT? OR CONNECT? OR BOND?) (S) MANIFOLD

=>

=>

=> s l1 and (integrat? or mat? or connect? or bond? or interfac?) (s) manifold  
2 FILES SEARCHED...

L7 70 L1 AND (INTEGRAT? OR MAT? OR CONNECT? OR BOND? OR INTERFAC?)  
(S) MANIFOLD

=> s l7 and (channel or microchannel) (s) network

L8 2 L7 AND (CHANNEL OR MICROCHANNEL) (S) NETWORK

=> s l7 and (electrokinetic or electroosmotic or electrophoretic or  
dielectrophoretic or modulator or gravity or magnetic or wicking)

L9 14 L7 AND (ELECTROKINETIC OR ELECTROOSMOTIC OR ELECTROPHORETIC OR  
DIELECTROPHORETIC OR MODULATOR OR GRAVITY OR MAGNETIC OR WICKING  
)

=> display l9 1-14 ibib abs

L9 ANSWER 1 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:243521 CAPLUS

TITLE: Micellar **electrokinetic** chromatography of  
small molecules and proteins on poly(dimethylsiloxane)  
**microfluidic** devices

AUTHOR(S): McDaniel, Kevin J.; Roman, Greg; Culbertson,  
Christopher

CORPORATE SOURCE: Texas Southern University, Houston, TX, 77004, USA

SOURCE: Abstracts of Papers, 231st ACS National Meeting,  
Atlanta, GA, United States, March 26-30, 2006 (2006),  
ANYL-216. American Chemical Society: Washington, D.  
C.

CODEN: 69HYEC

DOCUMENT TYPE: Conference; Meeting Abstract; (computer optical disk)

LANGUAGE: English

AB **Microfluidic** devices have several advantages over conventional  
scale chemical anal. instrumentation. These devices can **integrate**  
multiple chemical processing steps in a channel **manifold** so that a  
number of chemical manipulations can be performed either in series or parallel.  
Such systems are also known as micrototal anal. systems (mg-TAS). Several  
different types of chemical processing and handling steps have been  
demonstrated using  $\mu$ -TAS including mixing, reactions, filtering,  
preconcn. and sepn. Several of these processing and handling steps have  
been integrated to form devices capable of performing complete chemical  
analyses. The choice platform used for fabrication of  
**microfluidic** devices so far has been by far poly(dimethylsiloxane)  
(PDMS), a hydrophobic elastomer. This project explains the modification  
of PDMS channel walls using micellaelectrokinetic chromatog. The micelles  
play a dual role in these devices: they serve both as dynamic surface  
coating and as a psuedostationary phase. It is the psuedostationary phase  
which enables the separation of hydrophobic and neutral analytes.

L9 ANSWER 2 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:311958 CAPLUS

DOCUMENT NUMBER: 142:424974

TITLE: Microchip separations of protein biotoxins using an  
integrated hand-held device

AUTHOR(S): Fruetel, Julia A.; Renzi, Ronald F.; VanderNoot,  
Victoria A.; Stamps, James; Horn, Brent A.; West, Jay  
A. A.; Ferko, Scott; Crocker, Robert; Bailey,  
Christopher G.; Arnold, Don; Wiedenman, Boyd; Choi,  
Wen-Yee; Yee, Daniel; Shokair, Isaac; Hasselbrink,

CORPORATE SOURCE: Ernest; Paul, Philip; Rakestraw, David; Padgen, Debbie  
Sandia National Laboratories, Livermore, CA,  
94551-0969, USA  
SOURCE: Electrophoresis (2005), 26(6), 1144-1154  
CODEN: ELCTDN; ISSN: 0173-0835  
PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB We report the development of a hand-held instrument capable of performing two simultaneous microchip sepns. (gel and zone electrophoresis), and demonstrate this instrument for the detection of protein biotoxins. Two orthogonal anal. methods are chosen over a single method in order to improve the probability of pos. identification of the biotoxin in an unknown mixture. Sepns. are performed on a single fused-silica wafer containing two separation channels. The chip is housed in a **microfluidic manifold** that utilizes o-ring sealed fittings to enable facile and reproducible fluidic **connection** to the chip. Sample is introduced by syringe injection into a septum-sealed port on the device exterior that connects to a sample loop etched onto the chip. Detection of low nanomolar concns. of fluorescamine-labeled proteins is achieved using a miniaturized laser-induced fluorescence detection module employing two diode lasers, one per separation channel. Independently controlled miniature high-voltage power supplies enable fully programmable **electrokinetic** sample injection and anal. As a demonstration of the portability of this instrument, we evaluated its performance in a laboratory field test at the Defense Science and Technol. Laboratory with a series of biotoxin variants. The two separation methods cleanly distinguish between members of a biotoxin test set. Anal. of naturally occurring variants of ricin and two closely related staphylococcal enterotoxins indicates the two methods can be used to readily identify ricin in its different forms and can discriminate between two enterotoxin isoforms.

REFERENCE COUNT: 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 3 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:1061590 CAPLUS  
DOCUMENT NUMBER: 142:151109  
TITLE: Hand-Held Microanalytical Instrument for Chip-Based  
**Electrophoretic** Separations of Proteins  
AUTHOR(S): Renzi, Ronald F.; Stamps, James; Horn, Brent A.;  
Ferko, Scott; VanderNoot, Victoria A.; West, Jay A.  
A.; Crocker, Robert; Wiedenman, Boyd; Yee, Daniel;  
Fruetel, Julia A.  
CORPORATE SOURCE: Sandia National Laboratories, Livermore, CA,  
94551-0969, USA  
SOURCE: Analytical Chemistry (2005), 77(2), 435-441  
CODEN: ANCHAM; ISSN: 0003-2700  
PUBLISHER: American Chemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB The design, fabrication, and demonstration of a hand-held microchip-based anal. instrument for detection and identification of proteins and other biomols. are reported. The overall system, referred to as  $\mu$ ChemLab, has a modular design that provides for reliability and flexibility and that facilitates rapid assembly, fluid and microchip replacement, troubleshooting, and sample anal. Components include two independent separation modules that incorporate interchangeable fluid cartridges, a 2-cm-square fused-silica **microfluidic** chip, and a miniature laser-induced fluorescence detection module. A custom O-ring sealed **manifold** plate **connects** chip access ports to a fluids cartridge and a syringe injection port and provides sample introduction and world-to-chip **interface**. Other novel **microfluidic connectors** include capillary needle fittings for fluidic

**connection** between septum-sealed fluid reservoirs and the **manifold** housing the chip, enabling rapid chip priming and fluids replacement. Programmable high-voltage power supplies provide bidirectional currents up to 100  $\mu$ A at 5000 V, enabling real-time current and voltage monitoring and facilitating troubleshooting and methods development. Laser-induced fluorescence detection allows picomolar ( $10^{-11}$  M) detection sensitivity of fluorescent dyes and nanomolar sensitivity ( $10^{-9}$  M) for fluorescamine-labeled proteins. Migration time reproducibility was significantly improved when sepns. were performed under constant current control (0.5-1%) as compared to constant voltage control (2-8%).

REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 4 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:104896 CAPLUS

DOCUMENT NUMBER: 134:375494

TITLE: Design of an interface to allow **microfluidic** electrophoresis chips to drink from the fire hose of the external environment

AUTHOR(S): Attiya, Said; Jemere, Abebaw B.; Tang, Thompson; Fitzpatrick, Glen; Seiler, Kurt; Chiem, Nghia; Harrison, D. Jed

CORPORATE SOURCE: Department of Chemistry, University of Alberta, Edmonton, AB, T6G 2G2, Can.

SOURCE: Electrophoresis (2001), 22(2), 318-327

CODEN: ELCTDN; ISSN: 0173-0835

PUBLISHER: Wiley-VCH Verlag GmbH

DOCUMENT TYPE: Journal

LANGUAGE: English

AB An interface design is presented that facilitates automated sample introduction into an **electrokinetic** microchip, without perturbing the liqs. within the **microfluidic** device. The design uses an **interface** flow channel with a volume flow resistance that is 0.54- 4.1 + 10<sup>6</sup> times lower than the volume flow resistance of the **electrokinetic** fluid **manifold** used for mixing, reaction, separation, and anal. A channel, 300  $\mu$ m deep, 1 mm wide and 15-20 mm long, was etched in glass substrates to create the sample introduction channel (SIC) for a manifold of **electrokinetic** flow channels at 10-13  $\mu$ m depth and 36-275  $\mu$ m width. Volume flow rates of up to 1 mL/min were pumped through the SIC without perturbing the solns. within the **electrokinetic** channel manifold. Calcns. support this observation, suggesting a leakage flow to **electroosmotic** flow ratio of 0.1:1% in the **electrokinetic** channels, arising from 66-700  $\mu$ L/min pressure-driven flow rates in the SIC. Peak heights for capillary electrophoresis sepns. in the **electrokinetic** flow manifold showed no dependence on whether the SIC pump was on or off. On-chip mixing, reaction and separation of anti-ovalbumin and ovalbumin could be performed with good quant. results, independent of the SIC pump operation. Reproducibility of injection performance, estimated from peak height variations, ranged from 1.5-4%, depending upon the device design and the sample composition

REFERENCE COUNT: 31 THERE ARE 31 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 5 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1997:603279 CAPLUS

DOCUMENT NUMBER: 127:222291

TITLE: **Electroosmotic** Pumping of Organic Solvents and Reagents in Microfabricated Reactor Chips

AUTHOR(S): Salimi-Moosavi, Hossein; Tang, Thompson; Harrison, D. Jed

CORPORATE SOURCE: Department of Chemistry, University of Alberta, Edmonton, AB, T6G 2G2, Can.

SOURCE: Journal of the American Chemical Society (1997),  
119(37), 8716-8717  
CODEN: JACSAT; ISSN: 0002-7863  
PUBLISHER: American Chemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB **Electroosmotic** pumping of organic solvents and reaction of reagents within a network of integrated channels on a glass microchip is demonstrated. An organic phase reaction of p-nitrobenzenediazonium tetrafluoroborate (AZO) and N,N-dimethylaniline (DMA) in methanol or acetonitrile solvents, with 0.001 M tetraethylammonium perchlorate as electrolyte, demonstrated the on-chip reaction. The overall mobility of AZO was 9 and  $5 \times 10^{-5}$  cm<sup>2</sup>/V·s in acetonitrile and methanol, resp. The reaction products were determined on chip by absorbance at 488 nm, with peak absorbances in acetonitrile and methanol of  $0.18 \pm 0.01$  (standard deviation) and  $0.277 \pm 0.008$ , resp. Utilizing **electroosmotic** pumping to drive and control fluid flow within a **manifold** of **integrated** capillaries simplifies the fabrication of **microfluidic** devices in that no pumps or valves are needed. More complex microreactor designs based on this demonstrated **electroosmotic** fluid control could find application in highly automated synthesizers for combinatorial chemical  
REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 6 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(12):2021 COMPENDEX  
TITLE: Sol-gel modified poly(dimethylsiloxane) **microfluidic** devices with high **electroosmotic** mobilities and hydrophilic channel wall characteristics.  
AUTHOR: Roman, Gregory T. (Kansas State University 111 Willard Hall, Manhattan, KS 66506, United States); Hlaus, Tyler; Bass, Kevin J.; Seelhammer, Todd G.; Culbertson, Christopher T.  
SOURCE: Analytical Chemistry v 77 n 5 Mar 1 2005 2005.p  
1414-1422  
CODEN: ANCHAM ISSN: 0003-2700  
PUBLICATION YEAR: 2005  
DOCUMENT TYPE: Journal  
TREATMENT CODE: Theoretical; Experimental  
LANGUAGE: English

AN 2005(12):2021 COMPENDEX

AB Using a sol-gel method, we have fabricated poly(dimethylsiloxane) (PDMS) microchips with SiO<sub>2</sub> particles homogeneously distributed within the PDMS polymer **matrix**. These particles are [similar to]10 nm in diameter. To fabricate such devices, PDMS (Sylgard 184) was cast against SU-8 molds. After curing, the chips were carefully removed from the mold and sealed against flat, cured pieces of PDMS to form enclosed channel **manifolds**. These chips were then solvated in tetraethyl orthosilicate (TEOS), causing them to expand. Subsequently, the chips were placed in an aqueous solution containing 2.8% ethylamine and heated to form nanometer-sized SiO<sub>2</sub> particles within the cross-linked PDMS polymer. The water contact angle for the PDMS-SiO<sub>2</sub> chips was [similar to]90.2deg compared to a water contact angle for Sylgard 184 of [similar to]108.5deg. More importantly, the SiO<sub>2</sub> modified PDMS chips showed no rhodamine B absorption after 4 h, indicating a substantially more hydrophilic and nonabsorptive surface than native PDMS. Initial **electroosmotic** mobilities (EOM) of  $(8.3 \pm 0.2) \times 10^{-4}$  cm<sup>2</sup>/(V·s) (RSD = 2.6% (RSD is relative standard deviation); n = 10) were measured. This value was approximately twice that of native Sylgard 184 PDMS chips  $(4.21 \pm 0.09) \times 10^{-4}$  cm<sup>2</sup>/(V·s) (RSD = 2.2%; n = 10) and 55% greater than glass chips  $(5.3 \pm 0.4) \times 10^{-4}$  cm<sup>2</sup>/(V·s) (RSD = 7.7%; n = 5). After 60 days of dry storage, the EOM was  $(7.6 \pm 0.3) \times 10^{-4}$  cm<sup>2</sup>/(V·s) (RSD = 3.9%; n = 3),



a decrease of only 8% below that of the initially measured value. Separations performed on these devices generated 80 000-100 000 theoretical plates in 6-14 s for both tetramethylrhodamine succidimidyl ester and fluorescein-5-isothiocyanate derivatized amino acids. The separation distance was 3.5 cm. Plots of peak variance vs analyte migration times gave diffusion coefficients which indicate that the separation efficiencies are within 15% of the diffusion limit. \$CPY 2005 American Chemical Society. 81 Refs.

L9 ANSWER 7 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(5):3437 COMPENDEX  
TITLE: Hand-held microanalytical instrument for chip-based **electrophoretic** separations of proteins.  
AUTHOR: Renzi, Ronald F. (Sandia National Laboratories, Livermore, CA 94551-0969, United States); Stamps, James; Horn, Brent A.; Ferko, Scott; VanderNoot, Victoria A.; West, Jay A. A.; Cracker, Robert; Wiedenman, Boyd; Yee, Daniel; Fruetel, Julia A.  
SOURCE: Analytical Chemistry v 77 n 2 Jan 15 2005 2005.p 435-441  
CODEN: ANCHAM ISSN: 0003-2700  
PUBLICATION YEAR: 2005  
DOCUMENT TYPE: Journal  
TREATMENT CODE: Theoretical; Experimental  
LANGUAGE: English

AN 2005(5):3437 COMPENDEX

AB The design, fabrication, and demonstration of a hand-held microchip-based analytical instrument for detection and identification of proteins and other biomolecules are reported. The overall system, referred to as muChemLab, has a modular design that provides for reliability and flexibility and that facilitates rapid assembly, fluid and microchip replacement, troubleshooting, and sample analysis. Components include two independent separation modules that incorporate interchangeable fluid cartridges, a 2-cm-square fused-silica **microfluidic** chip, and a miniature laser-induced fluorescence detection module. A custom O-ring sealed **manifold** plate **connects** chip access ports to a fluids cartridge and a syringe injection port and provides sample introduction and world-to-chip **interface**. Other novel **microfluidic connectors** include capillary needle fittings for fluidic **connection** between septum-sealed fluid reservoirs and the **manifold** housing the chip, enabling rapid chip priming and fluids replacement Programmable high-voltage power supplies provide bidirectional currents up to 100  $\mu$ A at 5000 V, enabling real-time current and voltage monitoring and facilitating troubleshooting and methods development. Laser-induced fluorescence detection allows picomolar ( $10^{-11}$  M) detection sensitivity of fluorescent dyes and nanomolar sensitivity ( $10^{-9}$  M) for fluorescamine-labeled proteins. Migration time reproducibility was significantly improved when separations were performed under constant current control (0.5-1%) as compared to constant voltage control (2-8%). 18 Refs.

L9 ANSWER 8 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2004(5):2784 COMPENDEX  
TITLE: Low-dispersion **electrokinetic** flows for expanded separation channels in **microfluidic** systems: Multiple faceted interfaces.  
AUTHOR: Fiechtner, Gregory J. (Sandia National Laboratories MS 9951, Livermore, CA 94550, United States); Cummings, Eric B.  
SOURCE: Journal of Chromatography A v 1027 n 1-2 Feb 20 2004 2004.p 245-257  
CODEN: JCRAEY ISSN: 0021-9673  
PUBLICATION YEAR: 2004  
DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental  
LANGUAGE: English

AN 2004(5):2784 COMPENDEX

AB A novel methodology to design on-chip conduction channels is presented for expansion of low-dispersion separation channels. Designs are examined using two-dimensional numerical solutions of the Laplace equation with a Monte Carlo technique to model diffusion. The design technique relies on trigonometric relations that apply for ideal **electrokinetic** flows. Flows are rotated and stretched along the abrupt **interface** between adjacent regions having differing specific permeability. Multiple **interfaces** can be placed in series along a channel. The resulting channels can be expanded to extreme widths while minimizing dispersion of injected analyte bands. These channels can provide a long path length for line-of-sight optical absorption measurements. Expanded sections can be reduced to enable point detection at the exit section of the channel. Designed to be shallow, these channels have extreme aspect ratios in the wide section, greatly increasing the surface-to-volume ratio to increase heat removal and decrease unwanted pressure-driven flow. The use of multiple **interfaces** is demonstrated by considering several **three-interface** designs. Faceted flow splitters can be constructed to divide channels into any number of exit channels while minimizing dispersion. The resulting **manifolds** can be used to construct medians for structural support in wide, shallow channels. \$CPY 2003 Elsevier B.V. All rights reserved. 104 Refs.

L9 ANSWER 9 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2003(14):2742 COMPENDEX

TITLE: Monolithic membrane valves and diaphragm pumps for practical large-scale integration into glass **microfluidic** devices.

AUTHOR: Grover, William H. (Department of Chemistry University of California, Berkeley, CA 94720, United States); Skelley, Alison M.; Liu, Chung N.; Lagally, Eric T.; Mathies, Richard A.

SOURCE: Sensors and Actuators, B: Chemical v 89 n 3 Apr 1 2003 2003.p 315-323

CODEN: SABCEB ISSN: 0925-4005

PUBLICATION YEAR: 2003

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

AN 2003(14):2742 COMPENDEX

AB Monolithic elastomer membrane valves and diaphragm pumps suitable for large-scale **integration** into glass **microfluidic** analysis devices are fabricated and characterized. Valves and pumps are fabricated by sandwiching an elastomer membrane between etched glass fluidic channel and **manifold** wafers. A three-layer valve and pump design features simple non-thermal device **bonding** and a hybrid glass-PDMS fluidic channel; a four-layer structure includes a glass fluidic system with minimal fluid-elastomer contact for improved chemical and biochemical compatibility. The pneumatically actuated valves have <10 nl dead volumes, can be fabricated in dense arrays, and can be addressed in parallel via an **integrated manifold**. The membrane valves provide flow rates up to 380 nl/s at 30 kPa driving pressure and seal reliably against fluid pressures as high as 75 kPa. The diaphragm pumps are self-priming, pump from a few nanoliters to a few microliters per cycle at overall rates from 1 to over 100 nl/s, and can reliably pump against 42 kPa pressure heads. These valves and pumps provide a facile and reliable **integrated** technology for fluid manipulation in complex glass **microfluidic** and **electrophoretic** analysis devices. \$CPY 2003 Elsevier Science B.V. All rights reserved. 41 Refs.

L9 ANSWER 10 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2001(44):5733 COMPENDEX

TITLE: ISHMAEL: In-situ sample handling modular analytical experimental laboratory.  
 AUTHOR: Bearman, G.H. (Jet Propulsion Laboratory California Institute of Technology MS 306-336, Pasadena, CA 91109, United States); Kossakovski, D.A.  
 MEETING TITLE: 2001 IEEE Aerospace Conference.  
 MEETING ORGANIZER: IEEE  
 MEETING LOCATION: Big Sky, MT, United States  
 MEETING DATE: 10 Mar 2001-17 Mar 2001  
 SOURCE: IEEE Aerospace Conference Proceedings v 1 2001.p 1291-1298, (IEEE cat n 00TH8542)  
 ISSN: 1095-323X  
 PUBLICATION YEAR: 2001  
 MEETING NUMBER: 58534  
 DOCUMENT TYPE: Conference Article  
 TREATMENT CODE: Experimental  
 LANGUAGE: English  
 AN 2001(44):5733 COMPENDEX  
 AB In-Situ instruments are an integral part of mission designs for exploration of planetary surfaces. A technology gap exists today between sample acquisition and sample analysis tools. **Integrated** science payload packages need an **integrated** sample handling system. One approach is to transport and manipulate samples from a few microns up to [similar to]100 microns in diameter by a carrier fluid contained in **microfluidic manifold** of channels. We are developing a set of modular, reconfigurable, rapid prototyping components for sample manipulation. This set will consist of passive and active components. The passive components are easily stackable in three dimensions and can be built into complex distribution geometries to service many instruments. The active components will allow for sample sorting, gating and immobilization. We will use **dielectrophoretic** technology to manipulate particles in liquid flow. In addition to simply handling the sample we can also perform certain science tasks, such as dielectric spectroscopy or microscopic analysis of caged particles. 14 Refs.

L9 ANSWER 11 OF 14 COMPENDEX COPYRIGHT 2006 EEI on STN  
 ACCESSION NUMBER: 2000(16):3523 COMPENDEX  
 TITLE: Meso-scale electro-magnetically actuated normally closed valve realized on LTCC tapes.  
 AUTHOR: Gongora-Rubio, Mario (Inst de Pesquisas Tecnologicas, Sao Paulo, Braz); Sola-Laguna, Luis; Smith, Michael; Santiago-Aviles, Jorge J.  
 MEETING TITLE: Proceedings of the 1999 Microfluidic Devices and Systems II.  
 MEETING ORGANIZER: SPIE  
 MEETING LOCATION: Santa Clara, CA, USA  
 MEETING DATE: 20 Sep 1999-21 Sep 1999  
 SOURCE: Proceedings of SPIE - The International Society for Optical Engineering v 3877 1999.p 230-239  
 CODEN: PSISDG ISSN: 0277-786X  
 PUBLICATION YEAR: 1999  
 MEETING NUMBER: 56254  
 DOCUMENT TYPE: Journal  
 TREATMENT CODE: General Review  
 LANGUAGE: English  
 AN 2000(16):3523 COMPENDEX  
 AB Sensors and actuators with promising characteristics in aggressive environments and high temperatures have been developed using low temperature co-fired ceramic tape technology. We would like to report our work on an electro-magnetically actuated normally closed valve. This is a hybrid device which utilizes a purely LTCC tape electro-magnet and fluid flow **manifold**, combined with an anisotropically etched silicon rectangular planar spring, and a high energy product SmCo mini-permanent magnet. Device dimensions are in the meso (intermediate) range with the

smallest features (fluid conduit in the **manifold**) of 400 mu m and the largest (the actuating coil) of 15 mm. All parts of the electromagnet and the fluid flow channels were machined from DuPont 951 series, alumina based LTCC tapes utilizing either a numerically controlled milling machine, a puncher or an isotropic etching technique involving the glassy binder of a partially sintered LTCC tape. Two versions of this device have been fabricated. The first one, a hybrid, and an all ceramic (LTCC) valve. The hybrid device, currently under evaluation, consists of five layers of planar spiral coils, **connected** as to preserve the **magnetic** field direction. The total coil resistance is high (120 Ohms) and thermal considerations limits the current to 150 mA. Using a 900 Gauss SmCo magnet (1 mm diameter) we obtained 200 micrometers deflection of the rectangular planar spring with no hydraulic load. The best results so far are with the hybrid valve consisting of a silicon 30 micro-meter thick rectangular planar spring with a polysiloxane sealing element. (Author abstract) 11 Refs.

L9 ANSWER 12 OF 14 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2003:7690069 INSPEC

DOCUMENT NUMBER: B2003-08-2575F-075

TITLE: Monolithic membrane valves and diaphragm pumps for practical large-scale integration into glass **microfluidic** devices

AUTHOR: Grover, W.H.; Skelley, A.M.; (Dept. of Chem., California Univ., Berkeley, CA, USA), Liu, C.N.; Lagally, E.T.; Mathies, R.A.

SOURCE: Sensors and Actuators B (Chemical) (1 April 2003), vol.B89, no.3, p. 317-25, 41 refs.

CODEN: SABCEB, ISSN: 0925-4005

SICI: 0925-4005(20030401)B89:3L:317:MMVD;1-#

Price: 0925-4005/03/\$30.00

Published by: Elsevier, Switzerland

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

COUNTRY: Switzerland

LANGUAGE: English

AN 2003:7690069 INSPEC DN B2003-08-2575F-075

AB Monolithic elastomer membrane valves and diaphragm pumps suitable for large-scale **integration** into glass **microfluidic** analysis devices are fabricated and characterized. Valves and pumps are fabricated by sandwiching an elastomer membrane between etched glass fluidic channel and **manifold** wafers. A three-layer valve and pump design features simple non-thermal device **bonding** and a hybrid glass-PDMS fluidic channel; a four-layer structure includes a glass fluidic system with minimal fluid-elastomer contact for improved chemical and biochemical compatibility. The pneumatically actuated valves have <10 nl dead volumes, can be fabricated in dense arrays, and can be addressed in parallel via an integrated **manifold**. The membrane valves provide flow rates up to 380 nl/s at 30 kPa driving pressure and seal reliably against fluid pressures as high as 75 kPa. The diaphragm pumps are self-priming, pump from a few nanoliters to a few microliters per cycle at overall rates from 1 to over 100 nl/s, and can reliably pump against 42 kPa pressure heads. These valves and pumps provide a facile and reliable integrated **technology** for fluid manipulation in complex glass microfluidic and electrophoretic **analysis** devices

L9 ANSWER 13 OF 14 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2002:7140436 INSPEC

DOCUMENT NUMBER: B2002-02-7820-002

TITLE: Automated ultrasonic particle processing microsystem

AUTHOR: Sparey-Taylor, G.J.; Lewis, C.; Chapper, E.; (Lab. for Appl. Microsystems, Univ. of Wales Coll. of Cardiff, UK), Schiller, P.; Kern, P.; Barrow, D.A.;

SOURCE: Cefai, J.J.  
 Proceedings of the SPIE - The International Society  
 for Optical Engineering (2001), vol.4236, p. 107-14,  
 15 refs.  
 CODEN: PSISDG, ISSN: 0277-786X  
 SICI: 0277-786X(2001)4236L:107:AUPP;1-O  
 Price: 0277-786X/01/\$15.00  
 Published by: SPIE-Int. Soc. Opt. Eng, USA  
 Conference: Smart Electronics and MEMS II, Melbourne,  
 Vic., Australia, 13-15 Dec. 2000  
 Sponsor(s): SPIE; Dept. Defence; State Govern.  
 Victoria

DOCUMENT TYPE: Conference; Conference Article; Journal  
 TREATMENT CODE: Experimental  
 COUNTRY: United States  
 LANGUAGE: English

AN 2002:7140436 INSPEC DN B2002-02-7820-002

AB The use of ultrasonic technologies to trap and filter desired  
 particulates from a suspending media has been well documented to date.  
 Recent advancements in microsystems and micro-fluidic technology have  
 enabled the design of a miniaturised ultrasonic particle separation unit.  
 The automated microsystem. enables contact-less microprocessing  
 operations to be conducted on small volumes of fluid suspensions in  
 remote environments. Furthermore, the protocol for particle separation is  
 simplified and reduces the need for operator handling. The  
 microfabricated ultrasonic separator sub-system is combined with  
 micro-fluidic components (valves, pumps, flow sensors) **manifold**  
 systems and surface mount **interface** electronics to monitor and  
 control the system's function. The operational function of the system  
 utilises two reservoirs; (i) a pre-process reservoir containing crude  
 sample extract, and (ii) a second reservoir holding wash media. During  
 operation, a crude sample is channelled into the membrane-less filter  
 system and manipulated by ultrasonic sound waves. Wash media is  
 subsequently pumped into the filter, replacing or diluting the support  
 media of the original sample. The sample is then removed, when desired,  
 into a post-processing reservoir. The system has been developed for space  
 micro-**gravity** operations and other configurations are  
 applicable to other terrestrial processing applications

L9 ANSWER 14 OF 14 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2001:7055850 INSPEC  
 DOCUMENT NUMBER: A2001-21-9555-018; C2001-11-3380E-002  
 TITLE: ISHMAEL: in-situ sample handling modular analytical  
 experimental laboratory [for planetary surface  
 exploration]

AUTHOR: Bearman, G.H.; (Jet Propulsion Lab., California Inst.  
 of Technol., Pasadena, CA, USA), Kossakovski, D.A.

SOURCE: 2001 IEEE Aerospace Conference Proceedings (Cat.  
 No.01TH8542), vol.1, 2001, p. 1/291-8 vol.1 of 7 vol.  
 xxii+3688 pp., 14 refs.  
 ISBN: 0 7803 6599 2  
 Price: 0 7803 6599 2/2001/\$10.00  
 Published by: IEEE, Piscataway, NJ, USA  
 Conference: 2001 IEEE Aerospace Conference  
 Proceedings, Big Sky, MT, USA, 10-17 March 2001  
 Sponsor(s): IEEE Aerosp.; Electron. Syst. Soc

DOCUMENT TYPE: Conference; Conference Article  
 TREATMENT CODE: Application; Experimental  
 COUNTRY: United States  
 LANGUAGE: English

AN 2001:7055850 INSPEC DN A2001-21-9555-018; C2001-11-3380E-002

AB In-situ instruments are an integral part of mission designs for  
 exploration of planetary surfaces. A technology gap exists today between  
 sample acquisition and sample analysis tools. **Integrated**

science payload packages need an **integrated** sample handling system. One approach is to transport and manipulate samples from a few microns up to 100 microns in diameter by a carrier fluid contained in **microfluidic manifold** of channels. We are developing a set of modular, reconfigurable, rapid prototyping components for sample manipulation. This set will consist of passive and active components. The passive components are easily stackable in three dimensions and can be built into complex distribution geometries to service many instruments. The active components will allow for sample sorting, gating and immobilization. We will use **dielectrophoretic** technology to manipulate particles in liquid flow. In addition to simply handling the sample we can also perform certain science tasks, such as dielectric spectroscopy or microscopic analysis of caged particles